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# Flood Risk Assessment Rev0

Land East of Ugley Village Hall,
Ugley

10th April 2024

**Contents**

**Appendices**

**Appendix A** - Proposed Site Layout Plan
**Appendix B** - Greenfield Runoff Calculations

| Prepared by | Checked by | Date |
|---|---|---|
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## 1. Introduction

This Flood Risk Assessment (FRA) has been prepared in support of the proposed residential development on land to the east of Ugley Village Hall.

**Existing Site**

The proposed development site is approximately 1.05ha and is comprised of greenfield land.

**Proposals**

Proposals are for 16no. new dwellings to be accessed via an existing farm access on Pound Lane.

The proposed site layout plan is provided in **Appendix A**.

## 2. Planning Policy

**National Planning Policy Framework**

The aim of the National Planning Policy Framework (NPPF) (and accompanying Planning Practice Guidance (PPG)) is to direct development away from areas at highest risk of flooding; where development is necessary, it should be made safe without increasing flood risk elsewhere.

The NPPF states that a Flood Risk Assessment (FRA) is required to support a planning application for developments that are:

- located in Flood Zone 2 and/or Flood Zone 3
- located in Flood Zone 1 and comprise 1ha or above

In order to provide an indication of the flood zone classification of the site, and to ascertain whether an FRA is required, the starting point is the EA flood maps which are available on the EA website.

### Environment Agency Flood Map

The EA flood maps show fluvial and tidal flood outlines based on the following:

- Flood Zone 1 - land assessed as having less than 1 in 1000 annual probability of river or sea flooding
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding, or between a 1 in 200 and 1 in 1000 annual probability of flooding from the sea
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding, or a 1 in 200 or greater annual probability of flooding from the sea

The flood maps available on the EA website confirm that the site is located in Flood Zone 1.

However, given that the site is greater than 1ha, an FRA is required in support of the planning application.

## 3. Flood Risk Assessment

**Fluvial Flood Risk**

As previously noted, the site is in Flood Zone 1 and is therefore at very low risk of fluvial flooding.

**Groundwater Flooding**

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

Reference has been made to the British Geological Survey geology maps; these indicate that the site is underlain by Glaciofluvial Deposits, Mid Pleistocene - Sand and gravel. The underlying bedrock is Lewes Nodular Chalk Formation and Seaford Chalk Formation - Chalk.

BGS also provide borehole records but those at the site location are restricted.

Based on the above, there *may* be a risk of rising groundwater levels. However, no basement/ lower ground floor development is proposed, and therefore the development should not impact on current groundwater regimes.

**Surface Water Flooding**

Surface water flooding results from rainfall generated overland flows, before the runoff reaches a watercourse/ drainage system, or where the watercourse/ drainage system is overwhelmed and unable to accept further runoff. Surface water runoff is usually associated with high intensity rainfall events but may also occur with lower intensity rainfall where the ground is saturated, developed or otherwise has low permeability resulting in overland flows and ponding within depressions in the topography.

The EA provide maps on their website which illustrate the risk of surface water flooding along with potential depths and velocities; as shown in **Figure 1** overleaf, the site is at very low risk of surface water flooding.

**Sewer Flooding**

Sewer flooding occurs when the capacity of underground sewerage systems is exceeded, resulting in flooding inside and outside of buildings. Normal discharge of sewers and drains through outfalls may be impeded by high water levels in receiving waters.

There are no known records of surface water flooding at the site location.


**Figure 1 - Environment Agency Surface Water Flooding Maps**

## 4. Surface Water and SuDS

Given that the site is generally at very low risk of flooding from all sources, specific flood mitigation measures are not deemed necessary.

However, the existing site is entirely greenfield, and therefore the proposals will result in an increase in hardstanding areas. As such, consideration needs to be given to the management of surface water runoff.

This section of the report provides a simple overview of the management of surface water runoff over the lifetime of the development.

**Site Areas**

The whole site comprises approximately 1.05ha.

**Greenfield Rate of Runoff**

The **ICP SuDS** method within Micro Drainage has been used to calculate the greenfield rates of runoff from the existing site (as detailed in **Appendix B** and shown in **Table 1)**.

**Table 1 – ICP SuDS Greenfield Runoff Rates (l/s)**

| Return Period | Flow Rate from 1.05ha |
|---|---|
| **QBAR** | 0.4 |
| **1 in 30 year** | 0.8 |
| **1 in 100 year** | 1.2 |

## SuDS Approach

When choosing and designing SuDS for a development, it is important to recognise the constraints associated with the type of SuDS to be installed, including the size of the site and the underlying ground conditions. Most Councils set out a strategic approach for the disposal of surface water runoff, which mirrors the hierarchy set out in Building Regulations Approved Document Part H[1]. In general, these are as follows:

- **Rainwater re-use (rainwater harvesting/greywater recycling)**
  There is the potential for simple rainwater reuse. See the following section of this report.

- **An adequate soakaway or other infiltration system**

  As previously noted, the BGS geology maps indicate that the site is underlain by Glaciofluvial Deposits, Mid Pleistocene - Sand and gravel. The underlying bedrock is Lewes Nodular Chalk Formation and Seaford Chalk Formation - Chalk.

  On this basis, there is a good possibility that infiltration of surface water will be possible.

  In order to confirm this, infiltration testing to BRE Digest 365 will need to be carried out in order to a) confirm the suitability of the ground for infiltration, and b) confirm a rate of infiltration.

- **To a surface water body (e.g. an ordinary watercourse)**
  It is unknown whether there are any ordinary watercourses in the immediate vicinity of the site which could be used for the disposal of surface water.

[1] Building Regulations Approved Document H Section 3 page 45

- **To a surface water sewer, highway drain, or other drainage system**
  It is unknown whether there are any surface water (or combined) sewers, or any other drainage systems in the immediate vicinity of the site which could be used for the disposal of surface water.

**SuDS Options**

In line with the above drainage hierarchy, it is suggested that surface water runoff is managed in combination through:

- **Simple rainwater recycling at each dwelling (water butt)**
- **Infiltration SuDS (subject to infiltration testing to BRE Digest 365)**

### Water Butts

In order to provide a level of rainwater recycling, a water butt should be provided at each dwelling.

Water butts afford the opportunity to reduce the impact on already stretched potable water supply by enabling future occupants to reuse water collected in the water butt, for example when watering the garden/or washing cars etc. If this supply is used frequently this may also ensure that some additional storage is available during an extreme rainfall event (noting that there is a possibility that the tank may be full before the onset of a storm and as such there is no guarantee as to the level of attenuation storage they can provided).

Ideally, an overflow should be provided to prevent the rainwater tank from overflowing. This could be via a perforated hose to allow the tank to empty after a rainfall event thus making capacity for the next event.

### Infiltration SuDS

Given that the site is shown to be underlain by sand and gravel, and chalk, infiltration SuDS may be the most sustainable and effective way to manage surface water runoff from all new hardstanding areas at the redeveloped site.

Infiltration SuDS include soakaways and permeable paving, and these could be used alone or in combination. The landscaped areas could also be used to channel and convey surface water across the site.

It is recommended that infiltration testing to BRE Digest 365 is carried out as early as possible as this will a) confirm the suitability of the ground conditions for infiltration, and b) confirm a rate of infiltration.

From there, a SuDS strategy should be designed which will manage flows from all new hardstanding areas in up to the 1 in 100 year plus 40% allowance for climate change event.

## 5. Conclusions

This Flood Risk Assessment has been prepared in support of the proposed residential development on land to the east of Ugley Village Hall.

The proposed development site is approximately 1.05ha and is comprised of greenfield land.

Proposals are for 16no. new dwellings to be accessed via an existing farm access on Pound Lane.

**Flood Risk**

- The site is in Flood Zone 1 and is therefore at very low risk of fluvial flooding.
- Based on the desktop study of underlying ground conditions, there *may* be a risk of rising groundwater levels. However, no basement/ lower ground floor development is proposed, and therefore the development should not impact on current groundwater regimes.
- The EA surface water flooding maps show that the site is at very low risk of surface water flooding.
- There are no known records of surface water flooding at the site location.

**Surface Water and SuDS**

- The existing site is entirely greenfield, and therefore the proposals will result in an increase in hardstanding areas. As such, consideration needs to be given to the management of surface water runoff.
- In line with the drainage hierarchy, it is suggested that surface water runoff is managed in combination through:
  - Simple rainwater recycling at each dwelling (water butt)
  - Infiltration SuDS (subject to infiltration testing to BRE Digest 365 which will a) confirm the suitability of the ground conditions for infiltration, and b) confirm a rate of infiltration.

## Appendices

**Appendix A** - Proposed Site Layout Plan


# Landscaping Specification

GENERAL

Soil conditions - cultivate and plant into moist friable soil that is not waterlogged. Do not plant into frozen or snow covered soil.

Climate conditions - carry out the work while soil and weather conditions are suitable for the relevant operations. Do not plant during periods of frost or strong winds.
Plant during the following periods:
Bare root deciduous trees and shrubs; late October to late March.
Container grown plants; at any time if ground and weather conditions are favourable.
Ensure that adequate watering and weed control is provided.

Machines and tools - use only machinery and tools suitable for the site conditions and the work to be carried out. Use hand tools around trees, plants and in confined spaces.

Underground services - Contractor is responsible for knowing the ascertaining the position of any underground services and shall take precautions to prevent any damage occurring to them.
Immediately inform the appropriate body if damage occurs. The contractor shall be responsible for any claims resulting from such damage.

PLANT MATERIAL

Plant quality in general - to comply with the relevant part of BS 3936 and BS 5236 for any advanced nursery stock where applicable.
Materially undamaged, sturdy, healthy, vigorous, of good shape and without elongated shoots. Grown in a suitable environment and hardened off.
Free from pests, diseases, discoloration, weeds and physiological disorders. With balanced root and branch systems.
True to the names and sizes indicated within the plant schedule.

Bare root plants - all bare root plants shall have vigorous fibrous root systems which are reasonably equally developed in all directions and of adequate extent to support the growth of the plants root system.

Container grown plants - supplied in a growing medium with adequate nutrients for the plant to thrive until permanently planted.
Centred in the container, firmly and well watered.
With root growth substantially filling the container, but not root bound, and in a condition conducive to successful transplanting.
Grown in the open for at least two months before being supplied.
Grown in containers with holes adequate for drainage when placed on any substrate commonly used under irrigation systems.

Planting trees - spread a minimum of 75mm thick layer of well-rotted manure in the bottom of each pit and fork over.
Lay 50mm min. mixture of peat substitute/leaf mould/sharp sand 6:3:1 by volume, the peat being well moistened.
All manure is to be covered so that none comes in direct contact with the tree roots. Soak the roots of bare-rooted trees in water for at least an hour before planting. Continue backfilling with top soil into which 170gm of bonemeal has been mixed (per tree). Firm down well by heeling as filling proceeds.
The tree must be planted to the same depth as in the nursery and to the same orientation.
Before unloading, the depth and diameter of the rootball shall be measured to facilitate the digging of the pit to the correct size.
Back filling shall be done in layers of 150-225mm depth with each stage firmly consolidated to eliminate air pockets.

Staking - to be requisite length, pressure impregnated (with preservative non injurious to plants) de barked softwood 75mm diameter.

Tree ties - to be plastic ties 'Toms' pattern, nailed to stake with large head galvanised nails.

Watering - at the time of planting, each tree shall be well watered in. If there is a risk of frost within the 24 hours the watering shall be delayed until such risk has passed.

Mulch - apply 50mm mulch around trees immediately after watering in. Mulch to consist of pulverised natural pine bark such as 'Cambark' ornamental grade from Camland Products Ltd, 36 Regent Street, Cambridge or equivalent. Graded particles 8mm-25mm with all fines removed, free from pests, disease, weeds and additives.

Substitutes - if specified trees are unobtainable or known to be likely to be unobtainable at the time of ordering, submit alternatives and obtain approval from LPAbefore making any substitution.

PREPARATION OF PLANTING

Site clearance - Prior to cultivation all rubbish including stones, bricks, concrete, mortar, building materials, bottles, cans, litter, wood, plastic etc to be removed to tip.
Remove all weed from planting areas either by hand pulling or using a herbicide containing glyphosate as the active ingredient which should be applied in accordance with the manufacturer's instructions allowing sufficient time prior to cultivation for the chemical to be effective.

Cultivation - do not dig or cultivate within the root spread of trees and shrubs to be retained. Break up compacted topsoil to its full depth.

Tree pits - shall be of a diameter 600mm greater that the root ball. The depth of the pit shall be 225mm deeper than the root ball and not less than 600mm deep. The base of the tree pit shall be forked over to a depth of 225mm.

MAINTENANCE AND MAKING GOOD DEFECTS

Maintenance prior to practical completion - at all times maintain planted areas in a clean, tidy and largely litter weed free state.

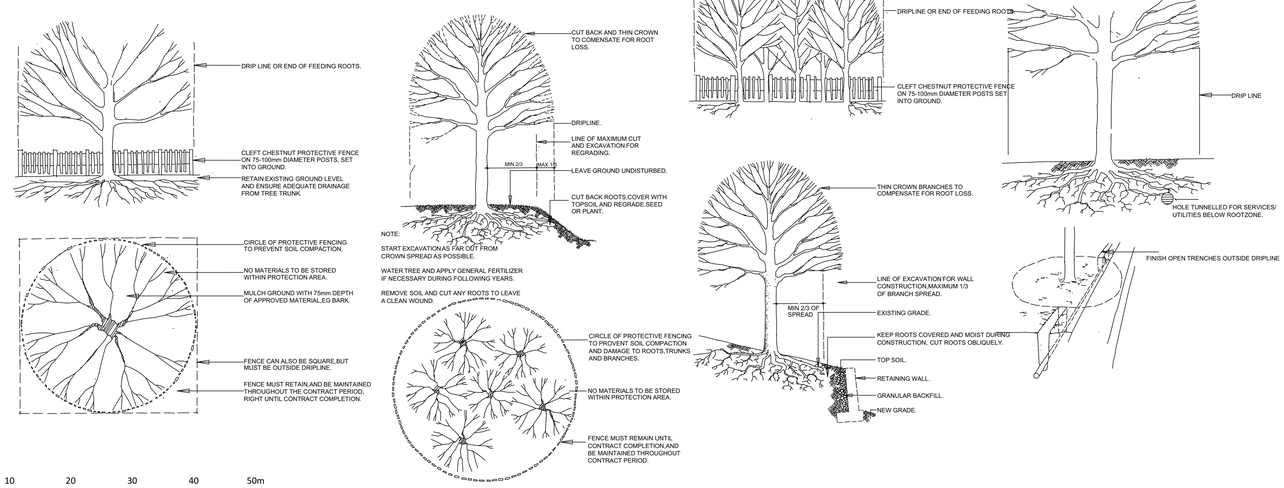
Maintenance and defects liability period - the maintenance and defects liability run concurrently for thirty months (three years) after practical completion.

Maintenance - Make visits at approximately monthly intervals during the growing season and as necessary to fulfil the requirements of this specification.
After each visit remove soil and other debris from surrounding hard surfaces and leave the site in a clean and tidy condition. Fork over beds as necessary to keep soil loose.
Ensure that the trees are not damaged by the use of mowers, nylon filament rotary cutters and similar powered tools.
Every two months check condition of stakes and ties and replace if missing or broken. Adjust as necessary to allow for growth and prevent the rubbing of bark.
Prune at appropriate times to remove dead, dying, diseased or damaged wood and suckers, to promote healthy growth and natural shape.

Failures of Planting - Excepting theft or malicious damage after practical completion, any of the trees that have failed to thrive, during the defects liability period, will be regarded as defects due to materials or workmanship not in accordance with this specification. Unless otherwise instructed they must be replaced by approved equivalent trees.
Replacements must match the original specification. Replacement planting is to be carried out during the planting season within which the defects are discovered.

If required because of insufficient rainfall, watering bags will be fitted to the trees and monitored/refilled every 5 days, until the tree is sufficiently established.

# Standard Tree Protection Details




0 10 20 30 40 50m

Scale 1:500

PV PANEL

Garden space - laid to lawn

Existing tree to be retained

Tree to be removed

Proposed tree

Proposed new boundary yew hedge

Proposed new boundary - 1.5m post and rail fence

Proposed new boundary - 1.8m close boarded fence

Block paved driveway

Patio

New 2m wide footpath

B Bat box - box to be concealed variety within structure. Box to face South, South East or South West

H Hedgehog box

Proposed LED lamps (max. 2000 lumens / 23-26 Watts) with PIR sensor. Temperature of 'warm white' (or as 2700k) and having a downward light angle (with no overspill of light past the horizontal plane).

## Planting Schedule

T1 - Holly
T2 - Field maple
T3 - Holly
T4 - Holly
T5 - Maple
T6 - Oak
T7 - Holly
T8 - Field Maple
T9 - Field Maple
T10 - Oak

N

| Issue | Description | Date |
|---|---|---|
| G | Visitor parking amended | 20/11/2023 |
| H | Swale added | 14/02/2024 |
| I | Amendments Following Drainage Design | 23/02/2024 |
| J | Topo removed | 12/03/2024 |
| K | Layout amendments | 09/04/2024 |

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| | |
|---|---|
| Project name: | Land East of Ugley Village Hall, Ugley |
| Drawing title: | Proposed Site Plan |
| Scale: 1:500 | Date: 09/04/2024 |
| Paper: A1 Paper | Drawn: SJG |
| Drawing no: | 596 x PL00 K |

All dimensions are in millimeters unless otherwise stated. Do not scale from this drawing. If in doubt, ask.

**Appendix B** - Greenfield Runoff Calculations

## ICP SUDS Mean Annual Flood

Input

| | | | |
|---|---|---|---|
| Return Period (years) | 100 | Soil | 0.150 |
| Area (ha) | 1.050 | Urban | 0.000 |
| SAAR (mm) | 608 | Region Number | Region 6 |

**Results l/s**

| | |
|---|---|
| QBAR Rural | 0.4 |
| QBAR Urban | 0.4 |
| Q100 years | 1.2 |
| Q1 year | 0.3 |
| Q30 years | 0.8 |
| Q100 years | 1.2 |